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TITLE: ULTRAVIOLET LIGHT AND INFRARED LIGHT ABSORBING  
TRANSPARENT MATERIAL

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ABSTRACT:

PURPOSE: To obtain an ultraviolet and infrared light absorbing transparent material having excellent permanence of adhesivity, chemical resistance, scratching resistance, etc., being transparent, capable of absorbing and screening ultraviolet and infrared light, especially sufficiently ultraviolet light approximately at 400nm without damaging optical characteristics.

CONSTITUTION: The surface of a transparent base is coated with a synthetic resin-based primer coating solution obtained by dissolving a fluorescent brightener, an ultraviolet light absorber and an infrared absorber and the solution is cured by heating to form an ultraviolet and infrared light absorbing thin film. This thin film is coated with a silicone-based hard coating solution prepared by dissolving a siloxane prepolymer in an

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organic  
solvent and the coating solution is cured by heating to form a  
protecting thin  
film. The objective ultraviolet and infrared light absorbing  
transparent  
material is thus obtained by the successive coatings. An acrylic  
primer  
coating solution is used as the synthetic resin-based primer coating  
solution  
to give the objective ultraviolet and infrared light absorbing  
transparent  
material.

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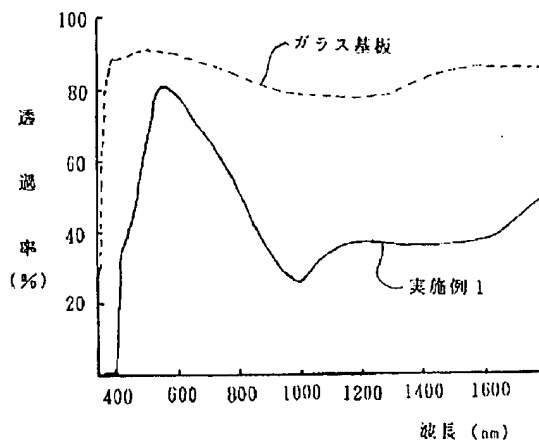
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(54) 【発明の名称】 紫外線赤外線吸収透明体

## (57) 【要約】

【目的】 光学特性を損なうことなく、透明で紫外線赤外線吸収を吸収遮蔽し、特に400nm 付近を十分に遮蔽することができ、密着性、耐薬品性、耐擦傷性等耐久性に優れた紫外線赤外線吸収透明体を得る。

【構成】 透明基材の表面に、蛍光増白剤および紫外線吸収剤および赤外線吸収剤を溶解添加してなる合成樹脂系プライマーコーティング溶液を塗布して加熱硬化し紫外線赤外線吸収性薄膜を形成した後、シロキサンプレポリマーが有機溶剤に溶解されてなるシリコン系ハードコーティング溶液を塗布して加熱硬化し保護薄膜を形成することで順次被覆して成る紫外線赤外線吸収透明体。並びに合成樹脂系プライマーコーティング溶液がアクリル系プライマーコーティング溶液である紫外線赤外線吸収透明体。



## 【特許請求の範囲】

【請求項1】 透明基材の表面に、蛍光増白剤および紫外線吸収剤および赤外線吸収剤を溶解添加してなる合成樹脂系プライマーコーティング溶液を塗布して加熱硬化し紫外線赤外線吸収性薄膜を形成した後、シロキサンプレポリマーが有機溶剤に溶解されてなるシリコン系ハードコーティング溶液を塗布して加熱硬化し保護薄膜を形成することで順次被覆して成ることを特徴とする紫外線赤外線吸収透明体。

【請求項2】 前記合成樹脂系プライマーコーティング溶液が、アクリル系プライマーコーティング溶液であることを特徴とする請求項1記載の紫外線赤外線吸収透明体。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、紫外線赤外線吸収性が優れたコーティング膜で被覆した透明体に関するものである。これらは紫外線赤外線遮蔽フィルターの部材として各種窓材、例えばビルあるいは住宅、車両、船舶、航空機、さらには種々のディスプレイ機器などに有用な紫外線赤外線吸収透明体である。

## 【0002】

【従来の技術とその問題点】従来から一般にガラス基板等透明体に紫外線赤外線吸収性を付与する処理方法としては、次の3種類にほぼ大別される。

【0003】まず、(1) 透明体自体に紫外線赤外線吸収性化合物を混入配合する方法。例えば、ガラス中に金属化合物を溶融添加する各種ガラス組成物（例えば、特開平4-224133号公報）、次いで(2) 紫外線赤外線吸収性透明膜を透明体表面に貼り合わせる方法。例えば、紫外線赤外線吸収剤を含有するポリビニルブチラル中間膜等を介して挟み込んだ合せガラス（例えば、特開昭59-152249号公報）等がある。さらに(3) 紫外線赤外線吸収性透明膜を透明体表面に積層形成する方法。例えば、透明体である基材にスパッタなどの気相成膜法で酸化亜鉛とアルミニウム含有酸化亜鉛を積層したもの（例えば、特公平4-44721号公報、特開平4-133004号公報）あるいは紫外線赤外線吸収剤を溶解した樹脂溶液による液相成膜法（例えば、特開平4-160037号公報、特開平5-42622号公報）または紫外線赤外線吸収剤を分散した樹脂溶液による液相成膜法（例えば、特開平2-75683号公報）による等があり、知られている。

## 【0004】

【発明が解決しようとする問題点】前述したように、例えば前記特開平4-224133号公報に記載のものは、いずれも少量多品種生産には向かず、UVA（長波長紫外線）吸収力も不十分なものである。

【0005】また、前記特開昭59-152249号公報に記載のものは、樹脂フィルム単独の場合より耐薬品性、耐擦傷性、耐久性が改善されるものの、形状対応性が悪く、

かなり厚くなって軽量化になり難く、UVA 吸収力も不十分なものである。

【0006】さらに、前記特公平4-44721号公報あるいは前記特開平4-133004号公報に記載のものは、ZnOが吸収ベースとなるため、耐湿性、耐薬品性、耐久性に不安があり、UVA 収力も不十分なものである。

【0007】さらに、特開平2-75683号公報ならびに特開平4-160037号公報に記載の従来の有機化合物系コーティング剤による方法では、大量の紫外線赤外線吸収剤を添加する必要があり、マトリックス樹脂層のみでは耐薬品性、耐擦傷性、耐久性などの面で相当劣るものとなる。

## 【0008】

【問題点を解決するための手段】本発明は、従来のかかる問題点に鑑みてなしたものであって、UVA を可視領域境界まできわめてシャープに遮蔽するための蛍光増白剤と、赤外線吸収剤のコーティング剤組成への適用をせしめつつ、種々の基材、ことに透明基材表面に対して密着性が良好な合成樹脂系プライマー、とくにアクリル系プライマーコーティング溶液に溶解添加し、紫外線赤外線吸収剤を共存させることにより蛍光を吸収するとともに耐光性を改善し、蛍光が目立たないコーティング膜を比較的低温で成膜させ、さらにこれをトップコートとなるシリコン系ハードコーティング膜で保護することで、ことに透明でUVA をシャープに遮蔽するとともに、熱線吸収性能をも具備した外装用としても使用可能な耐薬品性、耐擦傷性ならびに耐久性に優れた、有用な紫外線赤外線吸収透明体を提供するものである。

【0009】すなわち、本発明は、透明基材の表面に、蛍光増白剤および紫外線吸収剤および赤外線吸収剤を溶解添加してなる合成樹脂系プライマーコーティング溶液を塗布して加熱硬化し紫外線赤外線吸収性薄膜を形成した後、シロキサンプレポリマーが有機溶剤に溶解されてなるシリコン系ハードコーティング溶液を塗布して加熱硬化し保護薄膜を形成することで順次被覆して成ることを特徴とする耐久性に優れた紫外線赤外線吸収透明体。

【0010】ならびに、前記合成樹脂系プライマーコーティング溶液が、アクリル系プライマーコーティング溶液であることを特徴とする上述した紫外線赤外線吸収透明体をそれぞれ提供するものである。

【0011】ここで、前述したように、前記蛍光増白剤としては、紫外領域で吸収し、可視領域で蛍光を発生し、合成樹脂系プライマー、ことにアクリル系プライマーコーティング剤に溶融添加が可能であって、かつ塗膜が比較的低温の加熱硬化で変性しなければどのようなものでもよいものであり、しかも適度の耐熱性があり、吸収波長が紫外／可視領域境界（400nm 付近）にある例えば、Uvitex-0B（チバガイギー社製、2,5ビス（5'-ターシヤリブチルベンゾオキサゾリル）チオフェン）、ある

いはEB-501(三井東圧染料社製)、さらにNikkafluor S B、KB、EFS、OB(日本化学工業社製)などが挙げられる。

【0012】また、共存せしめる前記紫外線吸収剤としては、例えばベンゾフェノン系、ベンゾトリアゾール系、シアノアクリレート系あるいはサリシレート系あるいはインドール系などが挙げられる。

【0013】また、共存せしめる前記赤外線吸収剤としては、例えばポリメチレン系(シアニン、ビリリウム、スクワリリウム、クロコニウム、アズレニウムなど)、フタロシアニン系、ジチオール金属錯塩系、ナフトキノ

ン系、アントラキノ系、インドールフェノール系、アゾ系、トリアリルメタン系、イモニウム系、ジイモニウム系の化合物などが挙げられる。

【0014】該蛍光増白剤と該紫外線吸収剤と該赤外線吸収剤の使用割合としては、重量比率で1:0.5:0.3から1:10:10程度であり、より安定確実にするための好ましい範囲としては1:3:0.5~1:6:6程度であり、蛍光増白剤が多くなると蛍光で透視性が悪化し、少な過ぎると所望のUVA吸収力が得られない。これらは総計としてプライマーコーティング液の0.1~10重量%が好ましく、溶解性に余裕があっても必要以上に添加するのは不経済となる。

【0015】さらにここで、合成樹脂プライマー、ことにアクリルプライマーについては、上記した蛍光増白剤と紫外線吸収剤と赤外線吸収剤を充分溶解するため、エチルセロソルブなどのエーテルアルコール系溶剤にジアセトンアルコールなどのケトンアルコール系溶剤やケトン、エーテルあるいは芳香族系溶剤を組み合わせ透明基材を侵さないように配慮した混合溶剤を用いるとよい。ことに透明基板がガラス板状体等の場合には、溶解力があるシクロヘキサノンなどのケトン系溶剤やトルエンなどの芳香族系溶剤が好ましい。

【0016】さらにまた、前記合成樹脂としては例えば、アクリル系樹脂、ウレタン系樹脂、フッ素系樹脂あるいはポリエステル系樹脂等であり、なかでも前記アクリル系樹脂としては市販の例えば、アクリルBRレジン(三菱レイヨン製)などを利用して濃度、粘度あるいは膜厚の関係によって調製すればよく、樹脂分濃度としては1~15wt%程度、粘度としては10~1000cP程度、プライマー膜厚としては0.5~10μm程度が好ましく、トップ膜厚としては1~5μm程度が好ましいため、全膜厚としては2~15μm程度が好ましいものとなる。

【0017】なお、透明基材がガラス製の場合には、密着性をより向上せしめるために、シランカップリング剤の利用が好ましく、例えばOS808A(大八化学製アクリル変性シリコン)などをプライマー溶液の約0.25~60重量%、樹脂分濃度の1/4~4程度添加するが、少な過ぎると効果がなく、多過ぎると不経済となる。

【0018】さらにまた、上述したように調製された前

記紫外線吸収性合成樹脂プライマー、ことに前記紫外線吸収性アクリルプライマーは、均一膜厚となるように、例えばディッピング法、スプレー法、フローコート法あるいは印刷法等で塗布し被膜とし、例えば約80℃程度以上で約1時間程度加熱乾燥するものであり、加熱不足であれば、シリコン系ハードコートである保護膜にプライマー成分が溶出して例えばくもりあるいはクラック等が発現し易く、また加熱が過多になると、シリコン系ハードコートである保護膜の密着性が悪化することになる。

【0019】また、前記シリコン系ハードコーティング溶液としては、基本的にはオルガノアルコキシシランを加水分解して得られるシロキサンプレポリマーのアルコール溶液をベースとしたものが好ましく、例えば本出願人が既に提案した特開昭62-220531号公報に記載の被覆用組成物のようなコロイダルシリカを含むものが耐擦傷性にも優れより好ましい。なお市販品では例えば、トスガード510(東芝シリコン製)あるいはSiコート2(大八化学製)などが利用できる。

【0020】さらに、塗布環境としては、例えば温度約15~25℃程度、湿度約40~50RH%程度、さらにクリーン度10,000以下程度が塗膜欠陥の防止の点で好ましい。また塗布法としては、前記紫外線赤外線吸収性合成樹脂プライマー、ことに紫外線赤外線吸収性アクリルプライマーと同様に、均一膜厚となるような、例えばディッピング法、スプレー法、フローコート法あるいは印刷法等が利用できる。膜厚としては約1~5μm程度が好ましく、薄いと表面保護膜効果がなくなり、厚いと加熱乾燥硬化時にクラックを発現し易くなるものである。さらに加熱乾燥硬化には約80℃程度以上の温度がよく、ことに透明基板がガラス板状体等の場合は約150℃程度で、約2時間程度の処理が表面硬度を高める上で好ましい。

【0021】なお、上記した紫外線吸収性アクリル系プライマーあるいはシリコン系ハードコーティング溶液の塗布性能を改善するため、フロー改良剤あるいはレオロジーコントロール剤などを適宜添加してもよいことは言うまでもない。

【0022】さらにまた、前記透明基材としては、例えば約80℃程度以上の耐熱性を有するものであればよいものであり、好ましくは無機ガラス、あるいはPC、PMMA、PETなどの樹脂ガラスなどであり、無機質または有機質を問わず、ことに形状等に特に限定されるものではなく各種形状に、また大きさあるいは特異構成のもの、例えば曲げ板ガラスとしてはもちろん、各種強化ガラスや強度アップガラス、平板や単板で使用できるとともに、複層ガラスあるいは合せガラスとしても適用できることは言うまでもない。

【0023】

【作用】前述したとおり、本発明によれば、蛍光増白剤と紫外線吸収剤と赤外線吸収剤とを共存せしめるプライ

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マー溶液とする、特異な構成よりなる紫外線赤外線遮蔽性に優れるコーティング膜ならびに十分なシリコン系ハードコーティングによる保護膜で被覆した透明体であるので、赤外線吸収剤の耐光性もよく蛍光増白剤の蛍光も目立たない被膜として比較的低温で成膜でき、きわめてシャープにUVAを可視領域境界まで遮蔽することができ、赤外線吸収性能が優れることはもちろん、密着性、耐薬品性、耐擦傷性あるいは耐久性に優れ、しかも可視光や電波の反射によるギラツキ感や電波シールド性もなく、外装用としても使用可能な、有用な紫外線赤外線遮蔽ウィンドウ等になり得る透明な紫外線赤外線吸収透明体を、簡単なコーティング処理によって容易にかつ安価に得ることができる。

【0024】

【実施例】以下、実施例により本発明を具体的に説明する。ただし本発明は係る実施例に限定されるものではない。

【0025】(紫外線赤外線吸収性アクリル系プライマーの調製)〔ガラス塗布用〕

攪拌機および循環器付きの丸底フラスコに溶媒となるシクロヘキサノン、プロピレングリコールモノメチルエーテルをはいり込み、常温で攪拌しながらアクリルレジンとしてダイヤナールBR-88またはBR-85(いずれも三菱レイヨン製)を投入する。さらに攪拌を続けながら蛍光増白剤としてUVITEX-OB(チバガイギー製)、紫外線吸収剤としてTINUVIN327(チバガイギー製)、また赤外線吸収剤としてSIR 159(三井東圧ファイン社製)やNIR-AM 1(帝国化学産業社製)を表1に示す割合で添加し、オイルバスで約30分程度かけて約95℃程度に昇温後、約30分程度保持して完全に溶解させる。次いで加温を止め、常温まで低下してから接着改良剤であるシリコン変成アクリル樹脂OS-808Aを添加し攪拌溶解してガラス塗布用の紫外線赤外線吸収性アクリル系プライマーを得た。

【0026】該紫外線赤外線吸収性アクリル系プライマー溶液は、透明で固形分約8~11%程度、粘度約250~350cP(25℃)程度であった。

(紫外線赤外線吸収性アクリル系プライマーの調製)

〔樹脂塗布用〕

攪拌機および循環器付きの丸底フラスコに溶媒となるシクロヘキサノン、ジアセトンアルコール、プロピレングリコールモノメチルエーテルをはいり込み、常温で攪拌しながらアクリルBR-85レジン(三菱レイヨン製)を投入する。さらに攪拌を続けながら蛍光増白剤UVITEX-OB(チバガイギー製)、紫外線吸収剤TINUVIN327(チバガイギー製)および赤外線吸収剤PA1001やSIR103(三井東圧ファイン製)等を表1に示す割合で添加し、オイルバスで約30分程度かけて約95℃程度に昇温後、約30分程度保持して完全に溶解させて樹脂塗布用の紫外線赤外線吸収性アクリル系プライマーを得た。

【0027】該紫外線赤外線吸収性アクリル系プライマ

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ー溶液は、透明で固形分約3~5%程度、粘度約180~250cP(25℃)程度であった。(シリコン系ハードコーティング溶液の調製)攪拌機および循環器付きの500ml丸底フラスコにメチルトリエトキシシラン100gと3-グリシドキシプロピルトリメトキシシラン10gをはいり込み、無水フタル酸0.04gを添加、オイルバスの湯浴で約40℃程度に加温し溶解させ、その後、弱塩基性コロイダルシリカ水溶液スノーテックスC(日産化学製、平均粒径約15μm程度、SiO<sub>2</sub>含有量約20%程度)100gを添加し、約40℃程度で約5日程度反応を行い、GPC(トーション製、ULC802A)による数平均分子量約1100程度、固形分約29%程度の組成物を得た。これに145gのイソプロピルアルコールを添加し、分画分子量1000の限外濾過器(日本ミリポア製)で濃縮し、GPCによる数平均分子量約1200程度、固形分約20%の組成物を得た。該組成物に硬化触媒としてジシアンジアミドを約0.1部程度添加してシリコン系ハードコーティング溶液を得た。

【0028】(性能評価法)

紫外線赤外線吸収性：分光光度計で吸収スペクトルパターンを測定。

蛍光性：屋外の自然太陽光下で目視観察。(気になる発光、くもりがない。)

表面硬度：ASTM D1044に準拠、摩耗輪CS-10F、500回転後のΔH(ヘーズ)値(%)。

【0029】密着性：JIS K5400に準拠、基盤目(1mm口)テープ剥離残数を/100で表示。

耐薬品性：酸 ---25wt% H<sub>2</sub>SO<sub>4</sub> 点滴テストで24hr。

【0030】

塩基 ---5wt% NaOH 点滴テストで4hr。

溶剤 ---100%エタノール 点滴テストで4hr。

耐候性：JIS D0205に準拠、サンシャインカーボンウェザーメーターで目視異常(膜クラック、剥離、顕著な黄変)がみられるまでの時間。

【0031】実施例1

大きさ約300mm×300mm、厚さ約3mmのクリア・フロートガラス基板を中性洗剤、水すすぎ、アルコールで順次洗浄し、乾燥した後、アセトンで払拭し被膜用ガラス基板とした。

【0032】該被覆用ガラス基板の片面をフィルムマスキングし、表1に示す調製済のガラス塗布用紫外線赤外線吸収性アクリル系プライマー溶液に浸漬し、約0.1cm/sec程度のスピードで引き上げ、約120℃程度で約0.5時間程度乾燥し、膜厚約6μ程度の紫外線赤外線吸収膜を形成した。

【0033】次いで、該紫外線吸収膜付ガラス基板を上記した調製済のシリコン系ハードコーティング溶液に浸漬し、約1cm/sec程度のスピードで引き上げ、約120℃程度で約0.5時間程度、約150℃程度で約0.5時間程度乾燥硬化し、膜厚約3μ程度の保護膜を形成した。

【0034】得られた紫外線赤外線吸収透明体である紫外線赤外線遮蔽ガラス基板を上記した性能評価法に従って評価した。その結果、図1に示すように、やや緑色を帯びているものの、UVAをほぼ100%遮蔽するものであって、日射透過率も50%以下となって充分熱線を遮蔽し、気になる発光発現ならびにくもりもなく防げ、表面硬度もテーパーテスト後のヘーズ値( $\Delta H$ )が5と耐擦傷性も優れ、耐候性も3000時間以上で目視異常がなく、耐薬品性も異常なく、優れた耐久性を有する紫外線赤外線吸収ガラス板を得た。

#### 【0035】実施例2〜3

実施例1と同様なガラス基板に、表1に示すようなプライマー溶液を用い、かつ実施例1と同様な成膜で、表1のような膜厚約6〜7 $\mu$ 程度の紫外線赤外線吸収膜を形成した。

【0036】次いで、該紫外線赤外線吸収膜付ガラス基板を市販のシリコン系ハードコーティング溶液であるトスガート510（東芝シリコン製）に浸漬し、約1cm/secのスピードで引き上げ、約120℃で約3時間程度乾燥硬化し、膜厚約3 $\mu$ 程度の保護膜を形成した。

【0037】得られた紫外線赤外線吸収透明体である紫外線赤外線遮蔽ガラス基板を実施例1と同様に評価した。実施例1と同様に所期の優れた紫外線赤外線吸収透明体であった。

#### 【0038】実施例4〜5

厚さ約3mm厚のPC板を、表1に示した樹脂塗布用紫外線吸収性アクリル系プライマー溶液に浸漬し、約0.1cm/sec程度のスピードで引き上げ、約120℃程度で約0.5時間程度乾燥し、膜厚約4または6 $\mu$ 程度の紫外線赤外線吸収膜を形成した。

【0039】次いで、該紫外線吸収膜付フィルムを上記した調製済のシリコン系ハードコーティング溶液に浸漬し、約1cm/sec程度のスピードで引き上げ、約120℃程度で約0.5時間程度、約150℃程度で約0.5時間程度乾燥硬化し、膜厚約3 $\mu$ 程度の保護膜を形成した。

【0040】得られた紫外線赤外線吸収透明体である紫外線赤外線遮蔽フィルムを実施例1と同様に評価した。実施例1と同様に所期の優れた紫外線赤外線吸収透明体であった。

#### 【0041】比較例1

表1に示すように蛍光増白剤UVITEX-OB（チバガイギー

製）と紫外線吸収剤TINUVIN327（チバガイギー製）で調製した紫外線吸収性アクリル系プライマーを用いた以外は実施例1と同様にして紫外線吸収性ガラス基板を得た。

【0042】得られた該紫外線吸収性ガラス基板については、外観上は良好であるが、UVAを100%遮蔽できず、日射透過率は90%以上のものであり、到底所期の紫外線赤外線吸収ガラス板とは言い難いものであった。

#### 【0043】比較例2

10 表1に示すように蛍光増白剤UVITEX-OB（チバガイギー製）と赤外線吸収剤NIR-AM1（帝国化学産業製）で調製した紫外線吸収性アクリル系プライマーを用いた以外は実施例1と同様にして紫外線赤外線吸収性ガラス基板を得た。

【0044】得られた該紫外線赤外線吸収性ガラス基板については、外観上はわずかしき青色蛍光を感じず、紫外に近い可視領域を一部遮蔽するもののそれまでのUVAの遮蔽ができておらず、耐候性は300時間程度のものであり、到底所期の紫外線赤外線吸収ガラス板とは言い難いものであった。

#### 【0045】比較例3

表1に示すように紫外線吸収剤TINUVIN327（チバガイギー製）と赤外線吸収剤NIR-AM1（帝国化学産業製）で調製した紫外線吸収性プライマーを用いた以外は実施例1と同様にして紫外線赤外線吸収性ガラス基板を得た。

【0046】得られた該紫外線赤外線吸収性ガラス基板については、400nm付近の遮蔽が不十分で、耐候性も1000時間程度のものであり、到底所期の紫外線赤外線吸収ガラス板とは言い難いものであった。

#### 30 【0047】比較例4

表1に示すように赤外線吸収剤NIR-AM1（帝国化学産業製）のみで調製した赤外線吸収性プライマーを用いた以外は実施例1と同様にして赤外線吸収性ガラス基板を得た。

【0048】得られた該赤外線吸収性ガラス基板については、紫外線カット性能がなく、耐候性も約500時間程度のものであり、到底所期の紫外線赤外線吸収ガラス板とは言い難いものであった。

#### 【0049】

#### 40 【表1】

	アクリルレジン (wt%)	蛍光増白剤 (wt%)	紫外線吸収剤 (wt%)	赤外線吸収剤 (wt%)	溶媒 (wt%)	接着改良剤 (wt%)	固形分 (%)	粘度 (cP)	プライマー 膜厚(μ)
実施例1	(a) 5	(b) 0.2	(c) 0.8	(d) 0.5	(e) 43.5 (e') 40.0	(f) 10	10	260	6 トップは3
2	(a) 7	(b) 0.2	(c) 0.8	(d') 0.1	(e) 41.9 (e') 40.0	(f) 10	11	350	7 トップは3
3	(a) 4	(b) 0.3	(c) 1.0	(d) 1.0	(e) 38.7 (e') 40.0	(f) 15	12	250	6 トップは3
4	(a') 3	(b) 0.3	(c) 1.2	(d'') 0.2	(e) 65.3 (e'') 37.0		8	180	4 トップは3
5	(a') 5	(b) 0.2	(c) 1.0	(d'') 1.0	(e) 63.0 (e'') 30.0		10	250	5 トップは3
比較例1	(a) 5	(b) 0.2	(c) 0.8		(e) 44.0 (e') 40.0	(f) 10	10	250	6 トップは3
2	(a) 5	(b) 0.2		(d) 0.5	(e) 44.3 (e') 40.0	(f) 10	10	250	6 トップは3
3	(a) 5		(c) 0.8	(d) 0.5	(e) 43.7 (e') 40.0	(f) 10	10	250	6 トップは3
4	(a) 5			(d) 0.5	(e) 45.0 (e') 40.0	(f) 10	10	250	6 トップは3

【0050】表1中は、(a) ダイヤナールBR88、  
(a') ダイヤナールBR85（共に、三菱レイヨン  
製）。(b) UVITEX-OB（チバガイギー製）。  
(c) TINUVIN327（チバガイギー製）。  
(d) NIR-AM1（帝国化学産業製）、(d') S  
IR159（三井東圧ファイン製）、(d'') PA10  
01（三井東圧ファイン製）、(d''') SIR103  
（三井東圧ファイン製）。(e) シクロヘキサノン、  
(e') プロピレングリコールモノメチルエーテル、  
(e'') ジアセトンアルコール。(f) シリコン変成  
アクリルレジン：OS808A（大八化学製）を各々示  
す。

【0051】

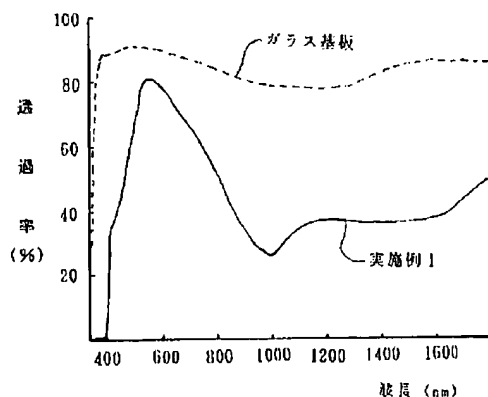
＊【発明の効果】以上前述したように、本発明によれば、  
光学特性を損なうことなく、透明でしかも紫外線赤外線  
を遮蔽、ことにUVAをほぼ完全に遮蔽することができ、  
熱線吸収性能も良好であり、密着性、耐薬品性、耐擦傷  
性あるいは耐久性に優れ、外装用としても使用可能とな  
り、しかも種々の機能性を付与し得ることができる、ビ  
ルあるいは住宅、車両等、種々の分野に広く採用できる  
有用な紫外線赤外線吸収透明体を容易にかつ安価に提供  
できるものである。

【図面の簡単な説明】

【図1】本発明の実施例1の紫外線赤外線吸収透明体お  
よび通常ガラス基板（フロートガラス3mm厚）の透過

＊30 率を示す。

【図1】





フロントページの続き

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 DETAILED DESCRIPTION
 

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## [Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the transparent body covered with the coating film excellent in ultraviolet-rays infrared-absorption nature. These are the ultraviolet-rays infrared-absorption transparent bodies useful to various aperture material, for example, a building, or a residence, vehicles, a vessel, the aircraft, further various display devices, etc. as an ultraviolet-rays infrared cover filter-member.

[0002]

[Description of the Prior Art] As an art which gives ultraviolet-rays infrared-absorption nature to general at the transparent bodies, such as a glass substrate, it is mostly divided roughly into the following three kinds from the former.

[0003] First, (1) How to carry out mixing combination of the ultraviolet-rays infrared-absorption nature compound at the transparent body itself. for example, the various glass constituents (for example, JP,4-224133,A) which carry out melting addition of the metallic compounds into glass -- subsequently -- (2) The method of sticking an ultraviolet-rays infrared-absorption nature transparent membrane on a transparent body surface. For example, there is laminated glass (for example, JP,59-152249,A) put through the polyvinyl butyral interlayer containing an ultraviolet-rays infrared-absorption agent etc. Furthermore, it is (3). How to carry out laminating formation of the ultraviolet-rays infrared-absorption nature transparent membrane at a transparent body surface. For example, the liquid phase forming-membranes method by the resin solution which dissolved the thing (for example, JP,4-44721,B, JP,4-133004,A) or ultraviolet-rays infrared-absorption agent which carried out the laminating of a zinc oxide and the aluminum content zinc oxide to the base material which is the transparent body by the gaseous-phase forming-membranes methods, such as a spatter, (for example, JP,4-160037,A, JP,5-42622,A) Or there is being based on the liquid phase forming-membranes method (for example, JP,2-75683,A) by the resin solution which distributed the ultraviolet-rays infrared-absorption agent etc., and it is known.

[0004]

[Problem(s) to be Solved by the Invention] As mentioned above, no things given in aforementioned JP,4-224133,A are fit for small quantity multi-form production, and its UVA absorptive power (ultraviolet A) is also inadequate.

[0005] Moreover, it is bad, although chemical resistance, abrasion-proof nature, and endurance are improved from a resin film independent case, configuration correspondence nature becomes quite thick and cannot become lightweight-ization easily, and a thing given in aforementioned JP,59-152249,A is UVA. Absorptive power is also inadequate.

[0006] Furthermore, a thing given in aforementioned JP,4-44721,B or aforementioned JP,4-133004,A is ZnO. Since it becomes the absorption base, misgiving is in moisture resistance, chemical resistance, and endurance, and it is UVA. \*\*\*\* is also inadequate.

[0007] Furthermore, it is necessary to add a lot of ultraviolet-rays infrared-absorption agents, and is fairly inferior in respect of chemical resistance, abrasion-proof nature, endurance, etc. with a matrix-

resin layer by the method by the conventional organic compound system coating agent given in a JP,2-75683,A row at JP,4-160037,A.

[0008]

[Means for Solving the Problem] It makes in view of the trouble which the former requires, and this invention is UVA. The fluorescent brightener for covering very sharply to a visible region boundary, Cheating out of application to coating agent composition of an infrared-absorption agent Various base materials, A transparent base-material front face is received especially. A synthetic-resin system primer with good adhesion, Especially, carry out dissolution addition at an acrylic primer coating solution, and while absorbing fluorescence by making an ultraviolet-rays infrared-absorption agent live together, lightfastness is improved. Make the coating film with which fluorescence is not conspicuous form at low temperature comparatively, and further this by protecting by the silicone system hard coating film used as topcoat It is especially transparent and is UVA. While covering sharply, chemical resistance usable also as an object for sheathing also possessing heat ray absorptivity ability and an abrasion-proof nature row are provided with the useful ultraviolet-rays infrared-absorption transparent body excellent in endurance.

[0009] That is, this invention is the ultraviolet-rays infrared-absorption transparent body excellent in the endurance characterized by covering with a siloxane prepolymer applying and carrying out heat hardening of the silicone system hard coating solution which it comes to dissolve in the organic solvent, and forming a protection thin film after applying and carrying out heat hardening of the synthetic-resin system primer coating solution which comes to carry out dissolution addition of a fluorescent brightener, an ultraviolet ray absorbent, and the infrared-absorption agent to the front face of a transparent base material and forming an ultraviolet-rays infrared-absorption nature thin film in it one by one, and changing.

[0010] A row is provided with the ultraviolet-rays infrared-absorption transparent body with which the aforementioned synthetic-resin system primer coating solution is characterized by being an acrylic primer coating solution and which was mentioned above, respectively.

[0011] As mentioned above, here as the aforementioned fluorescent brightener It absorbs by the ultraviolet region and fluorescence is emitted in a visible region. A synthetic-resin system primer, Melting addition is especially possible to an acrylic primer coating agent. and if a paint film does not denaturalize by low-temperature heat hardening comparatively, what thing may be used, moreover there is moderate thermal resistance, and absorption wavelength is in ultraviolet / visible region boundary (near 400nm) -- for example Uvitex-alumnus (the product made from Ciba-Geigy, 2, 5 screw (5'-tertiarybutyl benzoxazolyl) thiophene), EB-501 [ or ] (product made from 3 Ito \*\*\*\*\* Co.) -- Nikkafluor SB, KB, EFS, alumnus (Nippon Chemical Industrial Co., Ltd. make), etc. are mentioned further

[0012] Moreover, as the aforementioned ultraviolet ray absorbent made to live together, a benzophenone system, a benzotriazol system, a cyanoacrylate system, a SARISHI rate system, or the Indore system is mentioned, for example.

[0013] Moreover, as the aforementioned infrared-absorption agent made to live together, the compound of polymethylene systems (a cyanine, a pyrylium, SUKUWARIRIUMU, crocodile NIUMU, AZURENIUMU, etc.), a phthalocyanine system, a dithiol metallic complex system, a naphthoquinone system, an anthraquinone system, the Indore phenol system, an azo system, a triaryl methane system, a potato NIUMU system, and a G MONIUMU system etc. is mentioned, for example.

[0014] use of this fluorescent brightener, this ultraviolet ray absorbent, and this infrared-absorption agent -- if it carries out comparatively -- a weight ratio -- 1:0.5 : 0.3 from -- about 1:10:10 -- it is -- more -- stability -- if too few [ as a desirable range for ensuring, it is 1:3:0.5 to about 1:6:6, if fluorescent brighteners increase in number, transillumination nature will get worse by fluorescence, and ] -- desired UVA Absorptive power is not obtained. Even if 0.1 - 10% of the weight of primer coating liquid is desirable as the total as for these and a margin is in solubility, adding more than required becomes uneconomical.

[0015] It is still better especially to use the partially aromatic solvent considered so that a transparent

base material might not be invaded combining ketone-alcohol system solvents, or a ketone, the ether or aromatic system solvents, such as diacetone alcohol, to ether alcohols solvents, such as ethylcellosolve, since it was necessary to dissolve enough a synthetic-resin primer, and the fluorescent brightener, ultraviolet ray absorbent and infrared-absorption agent described above about the acryl primer here. Aromatic system solvents with which solvent power is [ a transparent substrate ] especially in the case of a glass-plate-like object etc., such as ketone system solvents, such as a cyclohexanone, and toluene, are desirable.

[0016] As the aforementioned synthetic resin, they are for example, an acrylic resin, an urethane system resin, a fluorine system resin, or a polyester system resin further again. as the aforementioned acrylic resin, marketing especially for example That what is necessary is just to prepare by relation between concentration, viscosity, or thickness using acrylic BR resin (Mitsubishi Rayon make) etc. As pitch concentration, about 1-15wt% and as viscosity, it is desirable, and as about 10-1000 cPs and primer thickness, since about 1-5micro is desirable as top thickness, about 0.5-10micro becomes what has desirable about 2-15micro as all thickness.

[0017] when a transparent base material is glass, in order [ in addition, ] to make adhesion improve more -- use of a silane coupling agent -- desirable -- for example, OS808A (acrylic denaturation silicone made from large 8 chemistry) etc. -- 1/10 of about 0.25 - 60% of the weight of a primer solution, and pitch concentration -- although it adds four to about four, if too few, it is ineffective, and it will become uneconomical if many [ too ]

[0018] To the aforementioned ultraviolet-absorption nature synthetic-resin primer and thing which were prepared further again as mentioned above, the aforementioned ultraviolet-absorption nature acryl primer Apply by the dipping method, the spray method, the flow coat method, or print processes, consider as a coat, for example, are about about 80 degrees C or more, carry out stoving for about about 1 hour, and if it is underheat, so that it may become uniform thickness When a primer component is eluted in the protective coat which is silicone system hard-coat, it becomes cloudy, it is easy to discover a crack etc. and heating becomes excessive, the adhesion of the protective coat which is silicone system hard-coat will get worse.

[0019] Moreover, what used as the base the alcoholic solution of the siloxane prepolymer which understands an organoalkoxysilane an added water part fundamentally and is obtained as the aforementioned silicone system hard coating solution is desirable, for example, what contains colloidal silica like the constituent for covering of a publication in JP,62-220531,A which these people already proposed is excellent also in abrasion-proof nature, and more desirable. In addition, in commercial elegance, the toss guard 510 (Toshiba Silicone make) or the Si coat 2 (product made from large 8 chemistry) can be used.

[0020] Furthermore, as application environment, it is desirable in respect of the prevention of an about 10,000 less than air cleanliness class of a paint film defect to the temperature of about about 15-25 degrees C, a humidity about 40 to 50 RH% grade, and a pan, for example. Moreover, as an applying method, the aforementioned ultraviolet-rays infrared-absorption nature synthetic-resin primer, a dipping method which serves as uniform thickness, a spray method, the flow coat method, or print processes can be used especially like an ultraviolet-rays infrared-absorption nature acryl primer. If about about 1-5micro is desirable and thin as thickness, the surface-protection film effect will be lost, and if thick, it will become easy to discover a crack at the time of stoving hardening. The temperature of about about 80 degrees C or more is still better for stoving hardening, and, in the case of a glass-plate-like object etc., a transparent substrate is abbreviation especially. It is desirable when processing of about about 2 hours raises surface hardness at about 150 degrees C.

[0021] In addition, in order to improve the application performance of the above-mentioned ultraviolet-absorption nature acrylic primer or a silicone system hard coating solution, it cannot be overemphasized that a flow improvement agent or a rheology control agent may be added suitably.

[0022] It is a thing further again that what is necessary is just what has the thermal resistance of about about 80 degrees C or more, for example as the aforementioned transparent base material. It is resin glass, such as inorganic glass, or PC, PMMA, PET, etc. preferably. In not a thing but the various

configurations which do not ask minerals or the quality of organic, but are especially limited to especially a configuration etc. Moreover, while being able to use it, of course with various tempered glass, on-the-strength rise glass, and a plate and the veneer as a size or the thing of unique composition, for example, bending sheet glass, it cannot be overemphasized that it is applicable also as a multiple glass or laminated glass.

[0023]

[Function] According to this invention, consider as the primer solution which makes a fluorescent brightener, an ultraviolet ray absorbent, and an infrared-absorption agent live together as mentioned above. Since it is the transparent body covered with the protective coat by sufficient silicone system hard coating for the coating film row which is excellent in the ultraviolet-rays infrared cover nature which consists of unique composition Membranes can be comparatively formed at low temperature as a coat on which the lightfastness of an infrared-absorption agent is also good and the fluorescence of a fluorescent brightener is not conspicuous, either. UVA can be covered to a visible region boundary very sharply. It excels in adhesion, chemical resistance, abrasion-proof nature, or endurance as well as an infrared-absorption performance being excellent. And the transparent ultraviolet-rays infrared-absorption transparent body which neither the light nor the feeling of a flash by reflection of an electric wave nor electric wave shield nature also has, and may become a useful ultraviolet-rays infrared cover window usable also as an object for sheathing etc. can be obtained easily and cheaply by easy coating processing.

[0024]

[Example] Hereafter, an example explains this invention concretely. However, this invention is not limited to the starting example.

[0025] [(Manufacture of an ultraviolet-rays infrared-absorption nature acrylic primer) For a glass application]

The cyclohexanone used as a solvent and a propylene glycol monomethyl ether are stuck on an agitator and a round bottom flask with a circulatory organ, and diamond NARU BR-88 or BR-85 (all are the Mitsubishi Rayon make) are supplied as acrylic resin, stirring in ordinary temperature. As a fluorescent brightener, continuing stirring furthermore UVITEX-alumnus (product made from Ciba-Geigy), SIR 159 (3 Ito \*\* fine company make) and NIR-AM1 (imperial chemistry industrial company make) are added at a rate shown in Table 1 as an ultraviolet ray absorbent as TINUVIN327 (product made from Ciba-Geigy), and an infrared-absorption agent. It holds at about about 95 degrees C about about 30 minutes, and is made to dissolve in them completely after a temperature up over about about 30 minutes by the oil bath. Subsequently, after stopping warming and falling to ordinary temperature, silicone conversion acrylic resin OS-808A which is an adhesion improvement agent was added, the stirring dissolution was carried out, and the ultraviolet-rays infrared-absorption nature acrylic primer for a glass application was obtained.

[0026] It is transparent and this ultraviolet-rays infrared-absorption nature acrylic primer solution is about about 8 - 11% of solid contents, and viscosity abbreviation 250 -350cP (25 degrees C). It was a grade.

[(Manufacture of an ultraviolet-rays infrared-absorption nature acrylic primer) For a resin application]

The cyclohexanone used as a solvent, diacetone alcohol, and a propylene glycol monomethyl ether are stuck on an agitator and a round bottom flask with a circulatory organ, and acrylic BR-85 resin (Mitsubishi Rayon make) is supplied, stirring in ordinary temperature. It added at a rate which shows fluorescent brightener UVITEX-alumnus (product made from Ciba-Geigy), an ultraviolet ray absorbent TINUVIN327 (product made from Ciba-Geigy), the infrared-absorption agents [ SIR / PA or / 103 (3 Ito \*\* fine \*\*) ] 1001, etc. in Table 1, continuing stirring furthermore, and held about about 30 minutes after the temperature up, it was made to dissolve in about about 95 degrees C completely over about about 30 minutes by the oil bath, and the ultraviolet-rays infrared-absorption nature acrylic primer for a resin application was obtained.

[0027] It is transparent and this ultraviolet-rays infrared-absorption nature acrylic primer solution is about about 3 - 5% of solid contents, and viscosity abbreviation 180 -250cP (25 degrees C). It was a

grade. (Manufacture of a silicone system hard coating solution) With an agitator and a circulatory organ They are methyl triethoxysilane 100g and 3-glycidoxy propyltrimethoxysilane 10g to 500ml round bottom flask. It stretches. 0.04g of phthalic anhydride It is made to warm and dissolve in about about 40 degrees C with the water bath of addition and an oil bath. then, the weak-base nature colloidal silica solution snow tex C (the product made from the Nissan chemistry --) About about 15 micrometers of mean particle diameters and 100g of SiO<sub>2</sub> contents were added about about 20%, it reacted [ about ] at about about 40 degrees C on about the 5th, and about about 1100 number average molecular weight by GPC (the Toso make and ULC802A) and the constituent of about about 29% of solid contents were obtained. 145g isopropyl alcohol is added to this, and it condenses by the ultrafilter (Nihon Millipore make) of a cut off molecular weight 1000, and is GPC. About about 1200 number average molecular weight and the constituent of about 20% of solid contents to twist were obtained. It is a dicyandiamide as a curing catalyst to this constituent About 0.1 Section grade addition was carried out and the silicone system hard coating solution was obtained.

[0028] (Performance-evaluation method)

Ultraviolet-rays infrared-absorption nature: Measure an absorption spectrum pattern with a spectrophotometer.

Fluorescence nature: It is visual observation under outdoor natural sunlight. (There are not luminescence to worry and cloudy weather.)

Surface hardness: It is conformity, wear ring CS-10F, and 500 to ASTM D1044. \*\*H (haze) value after rotation (%).

[0029] Adhesion: JIS K5400 Conformity and the number of squares (1mm mouth) tape \*\*\*\*\* are displayed by /100.

Chemical resistance: Acid ---- 25wt% H<sub>2</sub>SO<sub>4</sub> It is an intravenous drip test and they are 24hr(s).

[0030]

Base ---- 5wt% NaOH It is an intravenous drip test and they are 4hr(s).

Solvent ---- 100 % ethanol It is an intravenous drip test and they are 4hr(s).

Weatherability: JIS D0205 Time until visual abnormalities (a film crack, ablation, remarkable yellowing) are seen by conformity and the sunshine carbon weather meter.

[0031] About 3mm in example 1 size abbreviation 300mm x300mm and thickness The clearance float glass substrate was washed one by one in neutral detergent, water rinsing, and alcohol, and after drying, it wiped away with the acetone and considered as the glass substrate for coats.

[0032] Film masking of one side of this glass substrate for covering is carried out, it floods with the ultraviolet-rays infrared-absorption nature acrylic primer solution [ finishing / manufacture ] for a glass application shown in Table 1, and they are about 0.1cm / sec. It pulls up at the speed of a grade and is about 0.5 at an abbreviation 120 \*\* grade. Time grade dryness was carried out and the ultraviolet-rays infrared-absorption film of about about 6micro of thickness was formed.

[0033] Subsequently, it floods with the silicone system hard coating solution [ finishing / manufacture ] which described above this glass substrate with a ultraviolet-absorption film, and is about 1 cm/sec. It pulls up at the speed of a grade and is about 0.5 at an abbreviation 120 \*\* grade. It is about 0.5 at a time grade and an abbreviation 150 \*\* grade. Time grade dryness hardening was carried out and the protective coat of about about 3micro of thickness was formed.

[0034] It evaluated according to the performance-evaluation method which described above the ultraviolet-rays infrared cover glass substrate which is the obtained ultraviolet-rays infrared-absorption transparent body. Consequently, it is UVA although green is worn a little as shown in drawing 1 . It is what is covered about 100%. Enough, solar radiation permeability can also become 50% or less, it covers, and there is also no cloudy weather in the luminescence manifestation row to worry, and a heat ray can be prevented. The haze value after the Taber test (\*\*H) was excellent also in 5 and abrasion-proof nature, weatherability did not have visual abnormalities in 3000 hours or more, either, chemical resistance is also normal and surface hardness also obtained the ultraviolet-rays infrared-absorbing-glass board which has the outstanding endurance.

[0035] The ultraviolet-rays infrared-absorption film of about about 6-7micro of thickness as shown in

Table 1 was formed by the same membrane formation as an example 1, using a primer solution as shown in the same glass substrate as two to example 3 example 1 in Table 1.

[0036] Subsequently, it is immersed in the toss girt 510 (Toshiba Silicone make) which is the silicone system hard coating solution of marketing of this glass substrate with an ultraviolet-rays infrared-absorption film, and is about 1 cm/sec. It pulled up by speed, dryness hardening was carried out by about 120 \*\* for about about 3 hours, and the protective coat of about about 3micro of thickness was formed.

[0037] The ultraviolet-rays infrared cover glass substrate which is the obtained ultraviolet-rays infrared-absorption transparent body was similarly estimated as the example 1. It was the ultraviolet-rays infrared-absorption transparent body which was excellent in expected like the example 1.

[0038] It floods with the ultraviolet-absorption nature acrylic primer solution for a resin application which showed the PC board of an example 4 - about 3mm \*\* in 5 thickness in Table 1, and they are about 0.1 cm / sec. It pulls up at the speed of a grade and is about 0.5 at an abbreviation 120 \*\* grade. Time grade dryness was carried out and thickness 4 [ about ] or the about 6micro ultraviolet-rays infrared-absorption film was formed.

[0039] Subsequently, it floods with the silicone system hard coating solution [ finishing / manufacture ] which described above this film with a ultraviolet-absorption film, and is about 1 cm/sec. It pulls up at the speed of a grade and is about 0.5 at an abbreviation 120 \*\* grade. It is about 0.5 at a time grade and an abbreviation 150 \*\* grade. Time grade dryness hardening was carried out and the protective coat of about about 3micro of thickness was formed.

[0040] The ultraviolet-rays infrared cover film which is the obtained ultraviolet-rays infrared-absorption transparent body was similarly estimated as the example 1. It was the ultraviolet-rays infrared-absorption transparent body which was excellent in expected like the example 1.

[0041] The ultraviolet-absorption nature glass substrate was obtained like the example 1 except having used the ultraviolet-absorption nature acrylic primer prepared with fluorescent brightener UVITEX-0B (product made from Ciba-Geigy), and the ultraviolet ray absorbent TINUVIN327 (product made from Ciba-Geigy) as shown in example of comparison 1 table 1.

[0042] Although the exterior was good about this obtained ultraviolet-absorption nature glass substrate, about UVA, 100 % cover, it could not do, but it was 90% or more of thing, and solar radiation permeability was what is simply hard to be called expected ultraviolet-rays infrared-absorbing-glass board.

[0043] The ultraviolet-rays infrared-absorption nature glass substrate was obtained like the example 1 except having used the ultraviolet-absorption nature acrylic primer prepared by fluorescent brightener UVITEX-alumnus (product made from Ciba-Geigy), and infrared-absorption agent NIR-AM1 (product made from imperial chemistry industry) as shown in example of comparison 2 table 1.

[0044] Although an exterior does not sense deer blue fluorescence only about this obtained ultraviolet-rays infrared-absorption nature glass substrate but a part of near visible region is covered ultraviolet, it is the UVA till then. Cover is impossible and weatherability is 300. It was a thing about time and was what is simply hard to be called expected ultraviolet-rays infrared-absorbing-glass board.

[0045] The ultraviolet-rays infrared-absorption nature glass substrate was obtained like the example 1 except having used the ultraviolet-absorption nature primer prepared by the ultraviolet ray absorbent TINUVIN327 (product made from Ciba-Geigy), and infrared-absorption agent NIR-AM1 (product made from imperial chemistry industry) as shown in example of comparison 3 table 1.

[0046] About this obtained ultraviolet-rays infrared-absorption nature glass substrate, it is 400nm. Neighboring cover was inadequate, and weatherability was also the thing of about 1000 hours and it was what is simply hard to be called expected ultraviolet-rays infrared-absorbing-glass board.

[0047] The infrared-absorption nature glass substrate was obtained like the example 1 except having used the infrared-absorption nature primer prepared only by infrared-absorption agent NIR-AM1 (product made from imperial chemistry industry) as shown in example of comparison 4 table 1.

[0048] There is no ultraviolet-rays cut performance about this obtained infrared-absorption nature glass substrate, and it is also weatherability 500 [ about ]. It was a thing about time and was what is simply

hard to be called expected ultraviolet-rays infrared-absorbing-glass board.

[0049]

Table 1] *Acry Resin* *UV* *NIR* *Solvent* *SAR*

	アクリルレジン (wt %)	蛍光増白剤 (wt %)	紫外線吸収剤 (wt %)	赤外線吸収剤 (wt %)	溶媒 (wt %)	接着改良剤 (wt %)	固形分 (%)	粘度 (c p)	プライマー 膜厚 (μ)
実施例 1	(a) 5	(b) 0.2	(c) 0.8	(d) 0.5	(e) 43.5 (e') 40.0	(f) 10	10	260	6 トップは3
2	(a) 7	(b) 0.2	(c) 0.8	(d') 0.1	(e) 41.9 (e') 40.0	(f) 10	11	350	7 トップは3
3	(a) 4	(b) 0.3	(c) 1.0	(d) 1.0	(e) 38.7 (e') 40.0	(f) 15	12	250	6 トップは3
4	(a') 3	(b) 0.3	(c) 1.2	(d'') 0.2	(e) 55.3 (e'') 37.0		8	180	4 トップは3
5	(a') 5	(b) 0.2	(c) 1.0	(d'') 1.0	(e) 63.0 (e'') 30.0		10	250	6 トップは3
比較例 1	(a) 5	(b) 0.2	(c) 0.8		(e) 44.0 (e') 40.0	(f) 10	10	250	6 トップは3
2	(a) 5	(b) 0.2		(d) 0.5	(e) 44.3 (e') 40.0	(f) 10	10	250	6 トップは3
3	(a) 5		(c) 0.8	(d) 0.5	(e) 43.7 (e') 40.0	(f) 10	10	250	6 トップは3
4	(a) 5			(d) 0.5	(e) 45.0 (e') 40.0	(f) 10	10	250	6 トップは3

[0050] The inside of Table 1 is (a) diamond NARU BR 88 and diamond (a') NARU BR 85 (both Mitsubishi Rayon make). (b) UVITEX-alumnus (product made from Ciba-Geigy). (c) TINUVIN327 (product made from Ciba-Geigy). (d) NIR-AM1 (product made from imperial chemistry industry), SIR (d')159 (3 Ito \*\* fine \*\*), PA (d'')1001 (3 Ito \*\* fine \*\*), SIR (d''')103 (3 Ito \*\* fine \*\*). (e) A cyclohexanone, a propylene glycol monomethyl ether (e'), diacetone alcohol (e''). (f) Silicone conversion acrylic resin : OS808A (product made from large 8 chemistry) is shown respectively.

[0051]

[Effect of the Invention] Without spoiling an optical property according to this invention, as mentioned above It is transparent and, moreover, is UVA to cover and a thing about ultraviolet-rays infrared radiation. It can cover nearly completely. Heat ray absorptivity ability is also good and it excels in adhesion, chemical resistance, abrasion-proof nature, or endurance. It becomes usable also as an object for sheathing, and the useful ultraviolet-rays infrared-absorption transparent body widely employable as various fields, such as a building or a residence, and vehicles, which can moreover give various functionality can be offered easily and cheaply.

[Translation done.]



JAPANESE

[JP,07-267683,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL  
FIELD EFFECT OF THE INVENTION TECHNICAL  
PROBLEM MEANS OPERATION EXAMPLE  
DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

## \* NOTICES \*

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## CLAIMS

[Claim(s)]

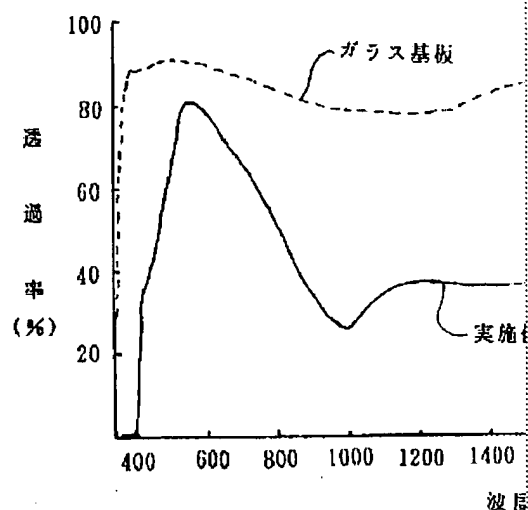
[Claim 1] The ultraviolet-rays infrared-absorption transparent body characterized by covering with a siloxane prepolymer applying and carrying out heat hardening of the silicone system hard coating solution which it comes to dissolve in the organic solvent, and forming a protection thin film after applying and carrying out heat hardening of the synthetic-resin system primer coating solution which comes to carry out dissolution addition of a fluorescent brightener, an ultraviolet ray absorbent, and the infrared-absorption agent to the front face of a transparent base material and forming an ultraviolet-rays infrared-absorption nature thin film in it one by one, and changing.

[Claim 2] The ultraviolet-rays infrared-absorption transparent body according to claim 1 with which the aforementioned synthetic-resin system primer coating solution is characterized by being an acrylic primer coating solution.

[Translation done.]

## Drawing selection

[Representative drawing]



[Translation done.]